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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/575,472

04/12/2006

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EXAMINER

WIESE, NOAH S

ART UNIT

PAPER NUMBER

4116

MAIL DATE

DELIVERY MODE

11/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/575,472	Applicant(s) CANSELL ET AL.	
	Examiner Noah S. Wiese	Art Unit 4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 21 and 22 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04/12/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/01/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election Acknowledged

1. Applicant's election without traverse is noted and made FINAL.

Status of Application

2. The claims 1-22 are pending and presented for the examination. Claims 1-15 and 21-22 have been elected without traverse for examination on merits. Claims 16-19 are withdrawn.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/FR04/02580.

Information Disclosure Statement (IDS)

4. The information disclosure statement (IDS) was submitted on 12/01/2006. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Please refer to applicant's copy of the 1449 herewith.

Claim Objections

5. Claim 11 is objected to because of the following informalities: The claim states that the precursor is "chosen from the family of *lasts*...". Based on the specification,

“lasts” is likely a typo that should read “salts”, and has been treated as such for purposes of examining the claim on merits. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 4, 7-11, and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al (Structure, sintering behavior and dielectric properties...).

Claim 1 is drawn to a method for obtaining ferroelectric material by coating ferroelectric particles with a layer of dielectric material.

Chen et al teaches a method of coating barium titanate powder (a ferroelectric) with silica (a dielectric material) (see Abstract). The method comprises placing barium titanate powder into a solution containing water and Na_2SiO_3 (see page 315, left column and page 316, left column). The coated powder is then dried and sintered (see page 315, right column). Because claim 1 does not define the amount of pressure under which the fluid is maintained, Chen et al inherently meets this limitation, because it would be understood by one of ordinary skill in the art that the Chen process is undertaken at atmospheric pressure. Atmospheric pressure is considered a reasonable interpretation of “under pressure”.

Claim 2 further limits claim 1 by stating that the fluid is maintained over 10°C.

Chen et al teach that the solution is maintained at 80°C (see page 315, left column).

Claim 4 further limits claim 1 by stating that the method further comprises the step of synthesizing the ferroelectric compound.

Chen et al teaches that the BaTiO₃ powders were synthesized by oxalate coprecipitation (see page 315, left column). As stated above, the vague limitation that the process is carried out “under pressure” can be met by the assumption that the coprecipitation was carried out at atmospheric pressure.

Claim 7 further limits claim 1 by specifying materials from which the ferroelectric compound can be chosen.

Claim 8 further limits claim 1 by stating that the ferroelectric compound is Ba_xSr_{1-x}TiO₃ or BaTiO₃.

Chen et al teaches that the ferroelectric material that is coated is BaTiO₃ (see Abstract).

Claim 9 further limits claim 1 by stating that the dielectric compound is chosen from oxides or nitrides.

Claim 10 further limits claim 9 by specifying materials from which the dielectric compound can be chosen.

Chen et al teaches that the dielectric compound coated on the barium titanate is silica, which is another name for SiO₂ (see Abstract).

Claim 11 further limits claim 1 by specifying materials from which the dielectric precursor can be chosen.

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Chen et al teaches that the dielectric precursor is water glass, Na_2SiO_3 . This is a Na-salt (see page 315, left column and page 316, left column).

Claim 13 further limits claim 1 by stating that the solvent is an alcohol, water, or a mixture thereof.

Chen teaches that the solvent used is water (see page 316, left column).

Claim 14 further limits claim 1 by giving size limitations for the ferroelectric particles.

Chen et al teaches that the BaTiO_3 particles are about 110-130 nm (see page 315, left column).

Claim 15 further limits claim 1 by giving thickness limitations for the dielectric coating layer.

Chen et al teaches that the silica film on the surface of the powder is about 5 nm (see Abstract).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (Structure, sintering behavior and dielectric properties...).

Claim 5 further limits claim 4 by stating that the synthesis is carried out above 10°C.

Although not explicitly stated, the teachings of Chen et al would lead one of ordinary skill in the art to understand that the synthesis of BaTiO₃ can be carried out at room temperature, above 10°C.

11. Claims 3, 6, 12, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (Structure, sintering behavior and dielectric properties...) in view of Berneburg et al (US 4552786).

Claim 3 further limits claim 1 by stating that the fluid containing the precursor used to coat the ferroelectric material is kept under supercritical conditions.

Claim 6 further limits claim 4 by stating that the synthesis of the ferroelectric is carried out under supercritical conditions.

Claim 21 further limits claim 2 by stating that the fluid containing the precursor used to coat the ferroelectric material is kept under supercritical conditions.

Claim 22 further limits claim 5 by stating that the synthesis of the ferroelectric is carried out under supercritical conditions.

Chen et al does not teach that the coating fluid is kept under supercritical conditions or that the synthesis of the ferroelectric material is carried out under supercritical conditions. However, it would have been obvious to one of ordinary skill in the art at the time that the invention was filed to modify Chen et al in view of Berneburg et al in order to obtain a method of using a precursor-containing liquid kept under supercritical conditions. This modification would have also motivated one to use supercritical conditions when producing BaTiO_3 by coprecipitation.

Berneburg et al teaches a method of infiltrating a porous ceramic with a fluid containing a solvent and the precursor to a ceramic. The fluid is kept under supercritical conditions to enhance infiltration and precipitation of the ceramic into the pores (see Abstract). This method could also be used to infiltrate a fluid containing a solvent and precursor into a ceramic powder. Both a porous ceramic and a ceramic powder have spaces between the areas of solid ceramic, so the same method could be used to achieve the desired effect, which is to fill the spaces with the precursor liquid. Therefore it would have been obvious to one of ordinary skill in the art to modify the method taught by Chen et al with the method and supercritical conditions taught by Berneburg et al.

Berneburg also teaches that the use of supercritical fluids containing ceramic precursors have great potential utility in the processing of ceramic materials. This is due to the fine control of solubility when the fluids are in the supercritical condition (see column 2, lines 32-47). Such control would obviously be beneficial when performing coprecipitation synthesis, such as is carried out by Chen et al to produce BaTiO_3 . Thus,

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the modification of Chen et al with Berneburg et al would have motivated one to use supercritical processing conditions in both the synthesis and coating of the ferroelectric.

One would have been motivated to make this modification because Berneburg et al teaches that the supercritical conditions for the fluid enhance the infiltration, and this would be a desired effect when infiltrating a fluid into a powder to coat said powder. One would have expected reasonable success in such a modification because, as stated above, porous ceramics and ceramic powders can be considered analogous for the purposes of infiltrating fluid because they are both ceramic bodies separated by spaces to be filled. Therefore, no detrimental effects would be expected by using supercritical conditions with fluid containing the solvent and precursor. Claims 3, 6, 21, and 22 are obvious and not patentably distinct over the prior art of record.

Claim 12 further limits claim 1 by stating that the solvent comprises CO₂ or NH₃.

Chen et al does not teach either of these substances as potential solvents. However, these substances are well known for their use as solvents under supercritical conditions. Berneburg et al teaches that CO₂ can be used as the solvent in the infiltration process (see Claim 2). When modifying Chen et al in Berneburg et al as discussed above, one would have been motivated to use the CO₂ solvent taught by Berneburg under the modified supercritical conditions. Therefore, claim 12 is obvious and not patentably distinct over the prior art of record.

Conclusion

12. No claim is allowed.

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13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Noah S. Wiese whose telephone number is 571-270-3596. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Noah Wiese
November 6th, 2007
AU 4116

/Vickie Kim/
Supervisory Patent Examiner, Art Unit 4116